CLAIMS

What is claimed is:

1. A method for constructing a cutting element for a drill bit used in drilling subterranean formations, comprising:

forming a substrate of a hard material, the substrate having at least one internal cavity and an attachment surface;

filling the at least one internal cavity with a substantially noncompressible filler material to a level at least coincident with the attachment surface;

attaching a superabrasive table to the attachment surface and over the substantially non-compressible filler material at an elevated temperature and at a high pressure; and

removing the filler material from the at least one internal cavity.

2. The method of claim 1, wherein removing the filler material comprises at least one of mechanically removing the filler material and dissolving the filler material.

3. The method of claim 1, wherein removing the filler material comprises removing a filler material which remains a solid at the elevated temperature and high pressure and becomes fluid at a lesser temperature and a lesser pressure.

4. The method of claim 1, further comprising selecting the filler material from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material.

5. The method of claim 1, wherein forming a substrate of a hard material comprises forming a substrate including an attachment surface having an outer periphery and further comprising:

forming at least one channel in the attachment surface of the substrate, the at least one channel having an outlet and an inlet, the outlet being proximate the outer periphery and the inlet being in communication with at least one the internal cavity;

filling the at least one channel with the substantially noncompressible filler material to a level at least coincident with the attachment surface prior to attaching the superabrasive table to the attachment surface; and

removing the filler material from the at least one channel after attaching the superabrasive table to the attachment surface.

6. The method of claim 5, wherein removing the filler material comprises at least one of mechanically removing the filler material and dissolving the filler material.

7. The method of claim 5, wherein removing the filler material comprises removing a filler material which remains a solid at the elevated temperature and high pressure and becomes fluid at a lesser temperature and a lesser pressure.

8. The method of claim 5, further comprising selecting the filler material from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material.

9. The method of claim 1, wherein attaching a superabrasive table on the attachment surface further comprises:

forming a superabrasive table including a bonding surface having an outer periphery and further including at least one channel formed within the bonding surface, the at least one channel configured to have an inlet, and an outlet proximate the outer periphery;

filling the at least one channel with the substantially noncompressible filler material prior to attaching the superabrasive table to the attachment surface;

attaching the superabrasive table to the substrate with the inlet of the at least one channel in communication with the internal cavity of the substrate; and

removing the filler material from the at least one channel.

10. The method of claim 9, wherein removing the filler material comprises at least one of mechanically removing the filler material and dissolving the filler material.

11. The method of claim 9, wherein removing the filler material comprises removing a filler material which remains a solid at the elevated temperature and high pressure and becomes fluid at a lesser temperature and a lesser pressure.

12. The method of claim 9, further comprising selecting the filler material from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material.

13. The method of claim 1, wherein forming a substrate of a hard material comprises forming a substrate including an attachment surface having an outer periphery and further comprising:

forming at least one channel in the substrate, the channel having an outlet and an inlet, the outlet being proximate the outer periphery of the attachment surface;

forming the superabrasive table to include a bonding surface having an outer periphery and at least one channel in the bonding surface, the channel having an inlet and an outlet, the outlet being proximate the outer periphery of the bonding surface;

placing the superabrasive table with the bonding surface over the attachment surface of the substrate with the at least one channel in the bonding surface and the at least one channel in the attachment surface in alignment so as to define at least one passage lying between the superabrasive table and the substrate;

filling the at least one channel in the substrate and the at least one channel in the bonding surface with the substantially noncompressible filler material;

attaching the bonding surface to the attachment surface at an elevated temperature and at a high pressure so as to achieve communication between the internal cavity and the at least one passage; and

removing the filler material from the at least one passage and the at least one internal cavity of the substrate.

14. The method of claim 13, wherein removing the filler material comprises at least one of mechanically removing the filler material and dissolving the filler material.

15. The method of claim 13, wherein removing the filler material comprises removing a filler material which remains a solid at the elevated temperature and high pressure and becomes fluid at a lesser temperature and a lesser pressure.

16. The method of claim 13, further comprising selecting the filler material from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material.

17. The method of constructing a cutting element for a drill bit used in drilling subterranean formations, comprising:

forming a primary substrate of a preselected hard material, the primary substrate having at least one internal cavity and an attachment surface;

forming a secondary substrate of a preselected hard material, the secondary substrate having an outer periphery and at least one channel therein, the at least one channel having an inlet and an outlet, the outlet being proximate to the outer periphery;

placing the secondary substrate on the attachment surface so as to create communication between the outlet of the at least one channel and the internal cavity;

filling the internal cavity and the at least one channel with a substantially noncompressible filler material;

forming a superabrasive table on the secondary substrate, and the secondary substrate to attachment surface at an elevated temperature and at a high pressure; and

removing the filler material from the internal cavity and the at least one channel.

18. The method of claim 17, wherein removing the filler material comprises at least one of mechanically removing the filler material and dissolving the filler material.

19. The method of claim 17, wherein removing the filler material comprises removing a filler material which remains a solid at the elevated temperature and high pressure and becomes fluid at a lesser temperature and a lesser pressure.

20. The method of claim 17, further comprising selecting the filler material from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material.

21. A method for constructing a cutting element for a drill bit used in drilling subterranean formations, comprising:

forming a substrate of tungsten carbide, the substrate having at least one internal cavity, an attachment surface, and at least one exterior cavity at the attachment surface, the exterior cavity being in communication with the internal cavity;

placing the substrate in a holding receptacle;

filling the internal cavity and the exterior cavity with a crystalline salt selected from the group consisting of a crystalline salt, halite, sodium chloride, boron nitride, a volcanic material, and Pyrofolyte material;

packing the crystalline salt to a predetermined density within the internal cavity and the exterior cavity;

disposing a layer of particulate diamond crystals atop the attachment surface and over the packed crystalline salt in the exterior cavity;

subjecting the holding receptacle, the substrate, the packed crystalline salt and the layer of particulate diamond crystals to an elevated temperature and to a high pressure for a sufficient time to form a superabrasive table from the layer of particulate diamond crystals securely bonded to the attachment surface;

removing the cutting element from the holding receptacle; and

removing the filler material from the internal cavity and the exterior cavity.